REMARKS

This Amendment is filed in response to the Advisory Action dated September 29, 2009. A Petition for a 3 month extension of time extending the period for response to December 11, 2009 is filed herewith.

Applicant requests a Telephone Interview with the Examiner

Applicant believes that a Telephone Interview with the Examiner would be beneficial to resolving the issues in this case. Applicant respectfully requests that Examiner call the undersigned to schedule this interview.

Applicant addresses 112 rejections

The Examiner indicates that the limitation "metadata" is vague and indefinite in Claims 1, 25, 45, and 62. Because Claim 62 does not recite "metadata", Applicant requests reconsideration and withdrawal of the rejection of Claim 62.

With regard to Claims 1, 25, and 45 (and their dependent claims), Applicant has replaced "metadata" with "information". The Specification, paragraphs 0031-0034 describe exemplary information that can be provided. Applicant respectfully submits that such information regarding "the second and third portions" of the design would certainly be understood by those skilled in the art. Because the term "information" is definite, Applicant requests reconsideration and withdrawal of the rejection of Claims 1, 3-9, 12-18, 25, 27-30, 32, 34-43, 45, 47-53, and 55-61.

Claims 1, 3-9, 12-19, 25, 27-30, 32-43, 45, 47-53, 55-62, 64-70, 72-78, and 83-96 are patentable over Schultz and Schulz

Claim 1, as amended, now recites in part:

analyzing the intermediate results to automatically construct merged results, the analyzing including:

identifying any first portions of the design that have not been analyzed;

identifying any second portions of the design that have been exhaustively analyzed for all mode and corner combinations; and

identifying any third portions of the design, the third portions of the design being other than the first and second portions, the third portions being less than exhaustively analyzed for all mode and corner combinations, wherein identifying each third portion includes identifying a level of analysis and a set of mode and corner combinations; and

outputting the merged results including information regarding the second and third portions.

Support for the recited "mode and corner combinations" is provided by paragraph 0032, which teaches that the merged results can query merged results based on a mode and corner combination, e.g. normal operation mode under all corners, or all modes under a specific corner. Logically, such a query is only possible when a mode and corner combination is part of identifying any second or third portions of the design, as recited in Claim 1.

The recited steps of analyzing and outputting provide advantages not recognized by Schultz. For example, as taught by Applicant in the Specification in reference to Figure 2:

> [0029] Note that in any mode certain parts of the design can be disabled. Saved results 203A-203C can therefore indicate what part(s) of the design have/have not been analyzed. STA tool 204 can quickly and accurately merge this complex coverage information from runs 200A-200C.
> [0030] Therefore, in accordance with one feature of the invention, merged results 205 can advantageously provide different levels of analysis coverage. For example, merged results 205 can indicate whether the design has been exhaustively analyzed for a particular mode and/or corner. Merged results 205 can also

indicate percentage coverage, i.e. how much of the total chip has been analyzed. Merged results 205 can also indicate any timing checks that were not performed.

These merged results can be generated by identifying portions of the design that have not been analyzed, portions that have been exhaustively analyzed for all mode/corner combinations, and portions that have not been exhaustively analyzed (i.e. identified by levels of analysis and sets of modes/corners) provides. Moreover, these merged results are particularly helpful for complex, large designs (which are now typical designs).

Applicant respectfully submits that because Schultz does not disclose or suggest the recited steps of analyzing and outputting, Schultz cannot provide the above-described advantages.

The Examiner cites paragraphs 0026-0029, 0032-0033, 0044, and FIGS. 7A-7D of Schultz as teaching the step of analyzing the intermediate results to construct merged results (including the steps of identifying the first, second, and third portions of the design) and outputting the merged results including data regarding the second and third portions.

Paragraph 0026 teaches that STA results may include values such as set up, hold time, rise/fall times, and pulse width checks **for each node** of a circuit. These values may be calculated for several corner cases.

Paragraphs 0027-0029 teach that multipass static timing analysis results, which may include an area of interest, may be displayed using a schematic display tool.

Paragraph 0032 teaches that **all of the corner cases for analysis are defined** in step 210 (see Figure 2). Step 212 then performs the STA for a particular corner case. The results from

that STA are saved in step 214. Step 216 ensures that **all corner cases are performed for all nodes of the design** (noting that the area of interest is defined (step 206) after multipass STA 204).

Paragraph 0033 teaches that the multipass analysis comprises comparing the results of the various corner cases to generate the change in values from one corner case to another. Those components or nodes with high differences may indicate that they are particularly susceptible to potential problems.

Paragraph 0040 (referring to FIG. 4) teaches choosing an area of interest and displaying the results of that area.

As shown in FIGS. 7A-7D, Schultz displays results for **all nodes** of an area of interest (wherein the nodes listed in FIGS. 7A-7D are all the nodes shown in FIG. 6, which constitute an area of interest).

More specifically, the Examiner argues that paragraph 0040 and FIGS. 7A-7D teach identifying any first portions of the design that have not been analyzed. The Examiner states that if a portion is not listed, then it has not been analyzed. Applicant traverses these characterizations. FIGS. 7A-7D list the nodes (of FIG. 6) for a marginal analysis performed in accordance with the technique described in FIG. 5. All nodes of FIG. 6 are listed and analyzed in FIGS. 7A-7D. Therefore, FIGS. 7A-7D teach nothing about identifying any portions of a design that have not been analyzed. **Paragraph 0040 refers to FIG. 4, which teaches a technique in which areas of interest are defined <u>after</u> multipass STA is performed.** Analysis results can be graphically displayed for each area of interest that is defined. Indeed, **Schultz consistently teaches that <u>areas of interest are defined after multipass STA</u>**, e.g. steps 104/106 (FIG. 1), steps 204/206 (FIG. 2), steps 304/306 (FIG. 3), and steps 404/406 (FIG. 4). Therefore, for any areas of interest to be allowed to

be displayed, multipass STA must logically be performed for every node for every portion of the design. Therefore, Schultz does not teach identifying any first portions of the design that have not been analyzed.

The Examiner further argues that paragraph 0032 teaches the step of identifying any second portions of the design that have been exhaustively analyzed for all modes/corners. Applicant traverses this characterization. Paragraph 0032 teaches that if all corner cases are completed, then multipass analysis is performed. Paragraph 0033 teaches that multipass analysis comprises comparing the results of the various corner cases to generate the change in values form one corner case to another. These paragraphs do not teach anything about **mode and corner combinations (as clarified by amendment herein)**.

The Examiner yet further argues that paragraphs 0026 and 0027 teach identifying any third portions of the design (including the level of analysis and a set of mode and corner combinations). Applicants traverse these characterizations. Paragraph 0026 teaches that static timing analysis (STA) results are provided for each node of a circuit and for "several" corner cases. Note that paragraph 0032 more accurately describes this aspect of the STA with respect to step 210 (FIG. 2) in which all of the corner cases for analysis are defined. Thus, Schultz actually teaches analyzing all nodes for all corner cases in an area of interest. The area of interest can be determined using logic cones, i.e. establishing a point in the schematic and tracing connecting logic upstream or downstream from that point, as taught in paragraph 0027. A dataset (listings of nodal analyses) or an area of interest does not teach the recited **third portions (i.e. the portions of the design that are less than exhaustively analyzed for all mode and corner combinations, as now recited explicitly in Claim 1)**, much less a level of

analysis and a set of mode and corner combinations for each third portion. Indeed, as indicated above, Schultz teaches nothing about mode and corner combinations.

The Examiner further argues that paragraph 0028 teaches outputting the merged results including information regarding the second and third portions. Applicant traverses this characterization. Paragraph 0028 merely teaches that the results from the area of interest can be displayed. As indicated above, Schultz actually teaches analyzing all nodes for all corner cases in an area of interest, which would be equivalent to exhaustive analysis. Schultz fails to teach anything about the recited first or third portions of the design. Therefore, logically, Schultz cannot teach merged results that include information regarding the second and third portions.

As indicated above, Applicant respectfully submits that the step of analyzing the intermediate results to construct merged results, which includes the recited identifying steps, is neither taught nor appreciated by Schultz. For example, the identifying steps recited in Claim 1 allow different levels of analysis for various portions of the design, thereby significantly improving resource management compared to Schultz. Moreover, Applicant's analysis of the intermediate results allow the outputted merged results to provide a user a depth of analysis that would not be possible using the combined teachings of Schulz and Schultz. Indeed, the recited outputted merged results including information regarding the second and third portions advantageously allow a user to quickly and intelligently make complex decisions in debugging a design.

Because Schulz and Schultz fail to disclose or suggest the recited steps of analyzing and outputting (with its attendant

advantages), Applicant requests reconsideration and withdrawal of the rejection of Claim 1.

Claims 3-9 and 12-18 depend from Claim 1 and therefore are patentable for at least the reasons presented for Claim 1. Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claims 3-9 and 12-18.

Claim 19 recites in part:

> analyzing the intermediate results to automatically construct merged results,
>
> wherein user-desired information regarding a predetermined set of mode and corner combinations is merged before other information,
>
> wherein the merged results indicate at least one of: what parts of the design have not been analyzed, whether the design has been exhaustively analyzed for a particular corner and mode combination, and whether the design has been exhaustively analyzed for all corner and mode combinations, and
>
> wherein the merged results associated with the desired information are user-accessible before the merged results associated with the other information.

The Examiner cites paragraphs 0027-0029, 0032-0033, 0035, 0038, and 0040 as teaching that desired information regarding a predetermined set of mode and corner combinations is merged before other information, and that the merged results associated with the desired information are user-accessible before the merged results associated with the other information. Applicant respectfully traverses these characterizations.

Paragraphs 0027-0029 teach that the multipass static timing analysis results, as limited by a defined area of interest after multipass STA, may be displayed using a schematic display tool.

Paragraph 0032 teaches that all of the corner cases for analysis are defined in step 210 (see FIG. 2). Step 212 then performs the STA for a particular corner case. The results from that STA are saved in step 214. Step 216 determines whether

another corner case has not yet been analyzed for static timing. If so, then STA is performed for that corner case.

Paragraph 0033 teaches that the multipass analysis of step 218 comprises comparing the results of the various corner cases to generate the change in values from one corner case to another. Those components or nodes with high differences may indicate that they are particularly susceptible to potential problems. Applicant respectfully submits that saving the multipass analysis in step 220 does not disclose or suggest merging desired information regarding a predetermined set of modes/corners before other information.

Paragraph 0034 teaches:

> The schematic capture and circuit generation in step 302 is input into the multipass timing analysis of step 304, followed by an area of interest definition step 306 and the results display of step 308.

FIGURE 3, as described in paragraphs 0034-0038, teaches details of the area of interest definition step 306. Notably, the area of interest definition step 306 is performed after the multipass static timing analysis step 304. Therefore, all static timing analysis is complete by the time step 306 is performed.

Paragraph 0040 teaches:

> [t]he results display of step 408 comprises choosing an area of interest in step 410, choosing the results analysis to display in step 412 and displaying the results graphically in step 414. If another set of results is requested for the area of interest in step 416, the step 412 of choosing results to display is executed. If no more results are requested in step 416, another area of interest may be desired in step 418 and the step 410 of choosing an area of interest is repeated. I[f] no other areas of interest are desired in step 418, the process terminates in step 420.

FIGURE 4, as described in paragraph 0040, teaches details of the results display step 408. Notably, the results display step 408 follows the multipass static timing analysis step 404 and the area of interest definition step 406. Therefore, all static timing analysis is complete by the time step 408 is performed.

Applicant respectfully submits that defining areas of interest (FIGURE 3, 306) or determining which area of interest to **display** first, second, etc. (FIGURE 4) does not disclose or suggest **merging desired information regarding a predetermined set of mode and corner combinations before merging other information**.

The Examiner argues that Shultz displays the results all at once, e.g. Figures 7A-7D, and therefore "merges" results into one dataset. However, Claim 19 refers to merging **user-desired** information **regarding a predetermined set of mode and corner combinations before merging other information**. Figures 7A and 7B show exemplary results using steps 502-508 (Figure 5), whereas Figures 7C and 7D show exemplary results using a differential multipass analysis 510. Notably, Figure 5 clearly teaches that results are displayed only in step 514, which occurs after all results are saved in steps 506, 517, 519, and 522. Therefore, Figures 7A-7D do not disclose or suggest the recited merging in Claim 19.

Moreover, Shultz fails to disclose or suggest that the merged results associated with the **user-desired information regarding the predetermined set of mode and corner combinations are user-accessible** before the merged results associated with the other information. The Examiner argues that Figure 2 showing that areas of interest can be defined teaches this limitation. Applicant submits that step 206 occurs after all multipass static timing analysis 204 is complete for all corner

cases. Therefore, in general, any particular results cannot be displayed until all analysis is complete. Moreover, the results are displayed by areas of interest (see, e.g. Figure 6). Claim 19 explicitly recites that the merged results indicate at least one of: what parts of the design have not been analyzed, whether the design has been exhaustively analyzed for a particular corner and mode combination, and whether the design has been exhaustively analyzed for all corner and mode combinations. Figure 2 fails to disclose or suggest such merged results.

The Examiner yet further argues that Shultz performs multipass analysis for pre-selected areas of interest. Notably, the Examiner provides no citation for this characterization. Applicant traverses any such characterization.

Based on all of the above reasons, Applicant requests reconsideration and withdrawal of the rejection of Claim 19.

Claim 25 recites in part:

> a third set of instructions for analyzing the intermediate results to automatically construct and output merged results, the third set of instructions including:
>
> instructions for identifying any first portions of the design that have not been analyzed;
>
> instructions for identifying any second portions of the design that have been exhaustively analyzed for all mode and corner combinations; and
>
> instructions for identifying any third portions of the design, the third portions of the design being other than the first and second portions, the third portions being less than exhaustively analyzed for all mode and corner combinations, wherein identifying each third portion includes identifying a level of analysis and a set of mode and corner combinations; and
>
> instructions for outputting the merged results including information regarding the second and third portions.

Therefore, Claim 25 is patentable for substantially the same reasons presented for Claim 1. Based on those reasons,

Applicant requests reconsideration and withdrawal of the rejection of Claim 25.

Claims 27-30 and 32 depend from Claim 25 and therefore are patentable for at least the reasons presented for Claim 25. Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claims 27-33 and 32.

Claim 33 recites in part:

> a fourth set of instructions for merging user-desired information regarding a predetermined set of mode and corner combinations before merging other information, wherein the merged results associated with the desired information are user-accessible before the merged results associated with the other information.

Therefore, Claim 33 is patentable for substantially the same reasons presented for Claim 19. Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claim 33.

Claim 34 recites in part:

> wherein analyzing the saved intermediate results includes:
>
> identifying any first portions of the design that have not been analyzed;
>
> identifying any second portions of the design that have been exhaustively analyzed for all mode and corner combinations; and
>
> identifying any third portions of the design, the third portions of the design being other than the first and second portions, the third portions being less than exhaustively analyzed for all mode and corner combinations, wherein identifying each third portion includes identifying a level of analysis and a set of mode and corner combinations; and
>
> reporting the merged results including information regarding the second and third portions.

Therefore, Claim 34 is patentable for substantially the same reasons presented for Claim 1. Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claim 34.

Claims 35-43 depend from Claim 34 and therefore are patentable for at least the reasons presented for Claim 34. Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claims 35-43.

Claim 45 recites in part:

> analyzing the intermediate results to automatically construct merged results, the merged results providing path information at multiple levels of detail, the analyzing including:
>
> identifying any first portions of the design that have not been analyzed;
>
> identifying any second portions of the design that have been exhaustively analyzed for all mode and corner combinations; and
>
> identifying any third portions of the design, the third portions of the design being other than the first and second portions, the third portions being less than exhaustively analyzed for all mode and corner combinations, wherein identifying each third portion includes identifying a level of analysis and a set of mode and corner combinations; and
>
> providing user access to the merged results including information regarding the second and third portions.

Therefore, Claim 45 is patentable for substantially the same reasons presented for Claim 1. Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claim 45.

Claims 47-53 and 55-61 depend from Claim 45 and therefore are patentable for at least the reasons presented for Claim 45. Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claims 47-53 and 55-61.

Claim 62 recites in part:

analyzing the saved results to construct merged results, the merged results providing analysis coverage that reports parts of the design that are analyzed for each mode and corner as well as parts of the design that are not analyzed for each mode and corner.

The Examiner cites paragraph 0040 and FIGS. 7A-7D of Schultz as teaching this limitation. Applicant respectfully traverses these characterizations.

Paragraph 0040 teaches that the results display of step 408 comprises choosing an area of interest in step 410, choosing the results analysis to display in step 412, and then displaying the results graphically in step 414. Schultz illustrates exemplary results (for the nodes in FIG. 6) in FIGS. 7A-7D. Notably, as shown in these figures, all nodes (of FIG. 6, marginal analysis) have been analyzed. Moreover, multipass STA is always performed before defining the areas of interest (see FIGS. 1, 2, 3, and 4). Therefore, to ensure results can be displayed, Schultz must analyze all nodes and corners before defining areas of interest. As a result, Schultz cannot disclose or suggest merged results that provide analysis coverage that reports **parts of the design that are not analyzed for each mode and corner**. (Applicant is confused by the Examiner's statement in reference to paragraph 0032 that the "nodes not listed in the results have not been analyzed". Paragraph 0032 merely indicates that the corner cases for analysis are defined in step 210 of Figure 2. This definition has nothing to do with defining nodes. Indeed, Applicant submits that the multipass static timing analysis 204 is performed for every node in the circuit.) Therefore, based on all of the above reasons, Applicant requests reconsideration and withdrawal of the rejection of Claim 62.

Claims 64-70 and 72-78 depend from Claim 62 and therefore are patentable for at least the reasons presented for Claim 62.

Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claims 64-70 and 72-78.

Claim 83 recites in part:

> analyzing the intermediate results to construct merged results, the merged results indicating for each path a percentage of times that timing violations exist for all analyzed modes and corners.

The Examiner admits that Schultz and Schulz do not teach this limitation. However, the Examiner cites Ernst as remedying the deficiency of Schulz and Schultz with respect to Claim 83. Applicant respectfully traverses this characterization. Specifically, Section 2 (which includes subsections 2.1, 2.2, and 2.3, and covers over 3 pages of text and figures) teaches Razor error detection/correction. The idea of Razor is to tune a supply voltage by monitoring the error rate (i.e. speed path failures) during operation. Section 1. According to Ernst in subsection 2.3, a control system works to maintain a constant error rate of E_{ref}. Specifically,

> At regular intervals the error rate of the system is measured by resetting an error counter which is sampled after a fixed period of time. The computed error rate for the sample E_{sample} is then subtracted from the reference error rate to produce the error rate differential E_{diff}. E_{diff} is the input to the voltage control function, which sets the target voltage for the voltage regulator. If E_{diff} is negative the system is [experiencing] too many errors, and voltage should be increased. If E_{diff} is positive the error rate is too low and voltage should be lowered. The magnitude of E_{diff} indicates the degree to which the system is "out of tune".

FIGS. 9 and 10 illustrate measured error rates in a multiplier block and simulated error rates for an adder, respectively.

Therefore, Ernst fails to disclose or suggest the recited merged results that indicate **for each path a percentage of times**

that timing violations exist for all analyzed modes and corners. Therefore, Applicant requests reconsideration and withdrawal of the rejection of Claim 83.

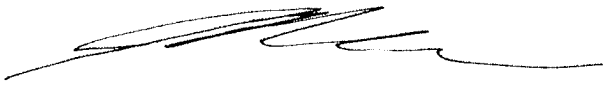
Claims 84-96 depend from Claim 83 and therefore are patentable for at least the reasons presented for Claim 83. Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claims 84-96.

CONCLUSION

Claims 1, 3-9, 12-19, 25, 27-30, 32-43, 45, 47-53, 55-62, 64-70, 72-78, and 83-96 are pending in the present application. Allowance of these claims is respectfully requested.

If there are any questions, please telephone the undersigned at 408-451-5907 to expedite prosecution of this case.

Respectfully submitted,



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